

### **REMARKS**

Claims 1-6, 13, 15, 17-18, 24-25 and 34-35 are amended herewith as indicated above. Claim 8, 10-12, 14, 20-23, 28-30 and 33 are cancelled herewith as indicated above. Claim 16 was previously cancelled. No new claims are added. Applicant expressly reserves the right to pursue the cancelled claim in one or more continuation or divisional applications. Support for the amendments to the claims can be found at least at paragraphs 0026-0035 of the Specification as originally filed. No new matter has been introduced through the amendments to the claims.

Claims 1-7, 9, 13, 15, 17-19, 24-27, 31-32 and 34-35 are pending for consideration. In view of the following amendments and remarks, Applicant respectfully requests that this application be allowed and forwarded on to issuance.

### **Examiner Interview**

Applicant respectfully thanks the Examiner for the time spent discussing the disposition of this case on January 23, 2008 with Applicant's representative via telephone. During the discussion, Applicant's representative and the Examiner discussed the cited art and some proposed claim modifications that would potentially receive favorable treatment by the Examiner. Applicant respectfully thanks the Examiner for the cooperative tone of the interview. However, no final agreement was reached during the telephone interview. Applicant believes that claim amendments presented above reflect the telephonic interview and examination in favor of allowance is respectfully requested.

1                   **§ 101 Rejections**

2                   Claims 25-34 stand rejected under 35 U.S.C. § 101 as allegedly being  
3                   directed to non-statutory subject matter (page 6 of Office action). Specifically, the  
4                   Office asserts that claim 25 defines a “computer readable medium having one or  
5                   more instructions causing one or more processors to:...”. However, the Office  
6                   asserts that claim 25 does not define a computer-readable medium or memory and  
7                   is thus non-statutory.

8                   Claim 25 has been amended to recite, among other things, “A computer-  
9                   readable storage medium encoded with one or more computer-executable  
10                  instructions, the one or more computer-executable instructions configured to cause  
11                  one or more processors to...”. The amendment to claim 25 was made pursuant to  
12                  the suggestions made by the Examiner during the telephonic interview cited above.

13                  Applicant asserts that the amendments to claims 25-34 fully address and  
14                  resolve the § 101 rejection there against, and respectfully requests that the § 101  
15                  rejection be withdrawn.

16  
17                  **§ 102 and § 103 Rejections**

18                  Claims 1-10, 15, 17-20, 23-27 and 31-35 stand rejected under 35 U.S.C. §  
19                  102(b) as being anticipated by “Development of Integer Cosine Transforms by the  
20                  Principle of Dyadic Symmetry”, IEE Proceedings, Vol. 136, Pt. 1., No. 4, pgs.  
21                  276-282 (“Cham”).

22                  Claims 11-14, 21-22 and 28-30 stand rejected under 35 U.S.C. § 103(a) as  
23                  being unpatentable over Cham, in view of “Simple Orthogonal Transform for  
24                  Image Coding”, Proceedings of IEEE Singapore International Conference, Vol. 1,  
25                  pgs. 465-469 (“Lo”).

Applicant respectfully traverses the § 102 and § 103 rejections in view of the amendments above and the arguments below.

### The Claims

**Claim 1**, as amended, recites a method for image data compression, comprising:

approximating at least one non-power-of-2 element of a base matrix as a power-of-2 element such that all elements of a resultant matrix  $T_2$  are power-of-2 elements, wherein the resultant matrix  $T_2$  is:

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further, for floating point coefficients  $a, b, c, d, e$ , and  $f$ :

$$a \geq b \geq c \geq d \text{ and } e \geq f,$$

$$a = 2, b = 2, c = 1, \text{ all } d = \frac{1}{2} \text{ or all } d = \frac{1}{4}, e = 2 \text{ and } f = 1; \text{ and}$$

encoding video data using the resultant matrix  $T_2$ .

Applicant respectfully disagrees and traverses the Office's rejection.

Specifically, Cham fails to provide a **resultant matrix  $T_2$**  having the specific form and elements as recited by the subject matter of claim 1, as amended. More particularly, Cham fails to provide any matrix of the particular form of the **resultant matrix  $T_2$** , as recited by claim 1, as amended, wherein  $a = 2, b = 2$ ,

1  $c = 1$ , all  $d = \frac{1}{2}$  or all  $d = \frac{1}{4}$ ,  $e = 2$  and  $f = 1$ . The significance of the resultant  
2 matrix  $T_2$  is borne out at least by the text at paragraphs 0044-0045 of the  
3 Specification as originally filed.

4 In contrast, Cham is directed to various transform matrices used in the  
5 compression of image data (Introduction of Cham). Cham also describes that all  
6 elements of such a matrix are either defined by  $\pm 1$ ,  $\pm a$ ,  $\pm b$ ,  $\pm c$ ,  $\pm d$ ,  $\pm e$ , or  $\pm f$ . (pages  
7 277-278 of Cham). However, in all exemplary matrices under Cham,  $e = 3$ .  
8 Furthermore, in all exemplary matrices under Cham, at least one of  $a$ ,  $b$ ,  $c$  or  $d$  is  
9 an odd value (e.g., 3, 5, 7, 9, 15, 201, 153, 185, etc.). Please refer to Table 7 on  
10 page 280 of Cham. In any case, Cham does not provide any matrix having the  
11 exacting characteristics as recited by the subject matter of claim 1, as amended.

12 For at least the foregoing reasons, as well as those applicable reasons  
13 argued previously in prosecution, Applicant asserts that claim 1, as amended, is  
14 allowable.

15 **Claims 2-7, 9 and 13**, as respectively amended, are also allowable at least  
16 as depending from an allowable base claim. While the respective rejections  
17 against claims 2-7, 9 and 13, have been fully considered, they are not seen as  
18 contributing anything of merit.

19 **Claim 15** has been amended and, as amended, recites an image data  
20 encoding apparatus, comprising:

21 a transformer to perform a 2-power transform on an incoming array of  
22 pixels, the transformer to perform the 2-power transform using a symmetrical  
23 matrix in which all elements are expressed as power-of-2 elements, wherein the  
24 resulting matrix  $T_2$  is:  
25

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further, for floating point coefficients  $a, b, c, d, e$ , and  $f$ :

$a \geq b \geq c \geq d$  and  $e \geq f$ ,

$a = 2, b = 2, c = 1$ , all  $d = \frac{1}{2}$  or all  $d = \frac{1}{4}, e = 2$  and  $f = 1$ ;

a quantizer to quantize the transformer result; and

an inverse transformer to perform an inverse 2-power transform on the quantizer result.

Applicant respectfully disagrees and traverses the Office's rejection.

Specifically, Cham fails to provide the specific **resulting matrix**  $T_2$  as recited by the subject matter of claim 15, as amended. For at least the foregoing reasons, Applicant further asserts that claim 15, as amended, is allowable.

**Claims 17-19 and 24**, as respectively amended, are allowable at least as depending from an allowable base claim. While the respective rejections against claims 17-19 and 24 (as amended) have been fully considered, they are not seen as contributing anything of merit.

**Claim 25** has been amended and, as amended, recites a computer-readable storage medium encoded with one or more computer-executable instructions, the one or more computer-executable instructions configured to cause one or more

processors to:

create a matrix such that all elements in the matrix are expressed as power-of-2 coefficients, wherein the resultant matrix  $T_2$  is:

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further the floating point coefficients are:

$a = 2, b = 2, c = 1$ , all  $d = \frac{1}{2}$  or all  $d = \frac{1}{4}, e = 2$  and  $f = 1$ ; and

encode video data using the resultant matrix  $T_2$ .

Applicant respectfully disagrees and traverses the Office's rejection.

Specifically, Cham fails to provide a **resultant matrix  $T_2$**  having the specific elements and characteristics as recited by the subject matter of claim 25, as amended. For at least the foregoing reasons, Applicant asserts that claim 25, as amended, is allowable.

**Claims 26-27, 31-32 and 34**, as respectively amended, are allowable at least as depending from an allowable base claim. While the respective rejections against claims 26-27, 31-32 and 34 (as amended) have been fully considered, they are not seen as contributing anything of merit.

**Claim 35** has been amended and, as amended, recites an image data encoding apparatus, comprising:

means for performing a 2-power transform on an incoming array of pixels, wherein all elements of the 2-power transform are equal to power-of-2 elements such that the resulting transform matrix  $T_2$  is:

$$T_2 = \begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & -d & -c & -b & -a \\ e & f & -f & -e & -e & -f & f & e \\ c & d & -a & -b & b & a & -d & -c \\ 1 & -1 & -1 & 1 & 1 & -1 & -1 & 1 \\ b & -a & -d & c & -c & d & a & -b \\ f & -e & e & -f & -f & e & -e & f \\ d & -c & b & -a & a & -b & c & -d \end{pmatrix}$$

wherein further the floating point coefficients are:

$a = 2, b = 2, c = 1$ , all  $d = \frac{1}{2}$  or all  $d = \frac{1}{4}$ ,  $e = 2$  and  $f = 1$ ;

means for quantizing the transformer result; and

means for performing an inverse 2-power transform on the quantizer result.

Applicant respectfully disagrees and traverses the Office's rejection.

Specifically, Cham fails to provide a **resulting transform matrix  $T_2$**  having the specific elements and characteristics as recited by the subject matter of claim 35, as amended. For at least the foregoing reasons, Applicant asserts that claim 35, as amended, is allowable.

#### **Comments Regarding Reference to Lo**

In addition to the arguments above in regard to Cham, Applicant asserts that the reference to Lo fails to provide those elements lacking in Cham. In

1 particular, Lo fails to provide any matrix having the exact form and element values  
2 as respectively recited by the subject matter of independent claims 1, 15, 25 and  
3 35, as respectively amended.

4 Specifically: 1) Cham (as cited above) does not provide any matrix wherein  
5 all elements are power-of-2 coefficients; and 2) Lo (as cited above) fails to  
6 provide any matrix wherein any element has an absolute value greater than unity  
7 (one). The immediately foregoing facts are in stark contrast to the characteristics  
8 of the matrices respectively recited by the subject matter of independent claims 1,  
9 15, 25 and 35, as amended.



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